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Who Gets to Ride? A Case Study in Inequality and Public Transportation in Santiago, Chile

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WHO GETS TO RIDE? A CASE STUDY IN INEQUALITY AND PUBLIC TRANSPORTATION IN SANTIAGO, CHILE

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ABSTRACT

While the metro public transportation system in Santiago, Chile was intended to serve all citizens equally, this did not become a reality. Instead, the metro has become a symbol of the short comings and failures in the state's city planning and expansions, benefitting the richer areas of the city. With a grand promise that was never fulfilled, frustration grew over time. While smaller protests were targeting public transportation with the increase to the fare of the metro, protests sparked overnight in 2019. However, by looking at the travel patterns, commute times, spatial inequalities, decision-making of metro expansions, and comuna level poverty rates, the story becomes clear. This project mostly focuses on recent years of the metro and Transantiago while providing the needed historical context.

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CHAPTER 1: INTRODUCTION

In October 2019, what first began as student-led protests in Santiago against a metro rush hour fare increase by $.041 quickly turned into mass protests across Chile. Much of the outrage spilled into the streets after members of the public viewed the government as unable to understand or sympathize with protestors. The protests became about more than the subway system, with protesters pointing to poor public health, low salaries, a poor pension system, lack of education rights, and overall inequality. Protestors called for a new constitutional assembly to change the constitution that has been in place since the Pinochet dictatorship in 1973, and the neo-liberal policies that have been implemented.

The protests became defined, in part, by mass amounts of violence by the state and protestors. Since the protests began, around 29 people died, 2,500 were injured and 2,800 people were arrested[2]. This prompted human rights investigations by organizations such as The Office of the United Nations High Commissioner for Huma Rights (OHCHR). The OHCHR documented 133 acts of torture and mistreatment by the national and local police. They also found "24 cases of sexual violence and isolated cases of psychological torture, including simulated executions, threats of forced disappearance and threats of rape" (McGowan 2019). The protests were the largest in Chilean history, with sometimes up to a million people in Plaza Italia in Santiago.

[1] The fare raise went into effect on October 6th, 2019

[2] These numbers vary across sources, The UN Human Rights Council investigation did verify at least 11 of the deaths, and said over 28,000 people were detained

The Metro

The metro was a large target of violence and destruction during the protests. Eighty metro stations were damaged costing around $300 million in damages (Chastain 2019). Metal sheets were thrown onto metro tracks, blocking the use of the subway, as well as protesters setting on fire some of the metro stops. One of the reasons the metro was targeted is because the system is seen as a symbol for the state. After all, it is effectively controlled by the presidency. Part of the Chilean President's power is to appoint the CEO of the Santiago Metro, policy often changes from one president to another. The changes the president implements for the metro can be representative of similar changes made in other areas, reflecting the priorities of the president and leading it to be a microcosm of the state. Further, the government has a lot of oversight of the metro and so many of the decisions made reflect the government's will and power even when the decisions might not be made by the president directly. As a result, the metro has gone through many changes with seemingly little cohesion, linking the change with the government at the time.

Dr. Andra Chastain, a professor in Latin American history who has specialized in the Santiago metro system, has been the main person pushing the argument that the metro system in Santiago can be viewed as a microcosm of Chile (Chastain 2019). Chastain reflects on how the more efficient and modern the metro system has become the more pressure it has placed on workers (Chastain 2019). This parallels how the everyday working-class citizen pays the price for the "Chilian Miracle"[3]. While experts may proclaim the system as efficient, if it does not respond to the needs of the people who most need it, it is not useful. While the metro has served

[3] The Chilean Miracle was a term used by Milton Friedman to describe the Chilean economy and economic policy put into place by the Chicago Boys, a group of Chilean economists who studied under Friedman at the University of Chicago

as a great investment to international actors it is viewed as a detriment to passengers who most need the system.

Inequality in Santiago

Economic inequality is one of the huge byproducts of neoliberal economic policies in Latin America, and especially Chile (Cambero et. al., 2019). Neoliberalism can best be described as extreme free-market capitalism, which involves the privatization of public goods, deregulation, liberalization, and financialization (Cambero et. al., 2019). Neoliberalism largely benefited the wealthy and put the poor at a disadvantage. This is because the policies further reduced the role of the state and infuse competition and individualism into areas such as labor relations, pensions, health, and education were introduced (Cambero et. al., 2019). Further extrapolating the strain on median income citizens, the central bank raised interest rates from 49.9% to 178% to counter high inflation in 1978 (Hira 1998). While there were economic strains on the country under Allende in 1970-73, the policies under Pinochet (after ’73) benefitted the wealthy more than the poor. This is seen in the protests of the metro. While the government was able to get inflation under control, inequality widened as wages and benefits to the working class were reduced. The metro was built under such policies. Though Chile is less neoliberal today than it was in the 1970s and 80s, the effects are still felt throughout the country. One consequence is that the metro less than optimality serves its citizens.

The protests in October 2019 brought to light a long problem of inequality in Santiago and Chile. The public transportation system of Santiago was shown to be unequal in an already unequal country. It is considered unequal because it is more focused on serving the upper to middle class to compensate for the high upkeep cost. For example, it is far nicer than any other metro system in Latin America. The metro is very clean, free of graffiti, and with art displays.

However, the under-served working class cares more that they get to work on time. According to La República, Santiago has the second most expensive subway fares (USD $0.92 - $1.12). The number one most expensive fare price is in Montevideo, Uruguay. For context, the minimum wage in Chile is around $381 USD compared to Uruguay's minimum wage of $436 (La República 2019).

However, on the surface, inequality numbers illustrate that Chile has been becoming more equal every year since 2000: GDP has gone up, the GINI coefficient has decreased, and poverty has decreased. GDP has increased from 77 billion in 2000 to 282 Billion in 2019 (World Bank 2020)[4]. The GINI coefficient, which measures wealth inequality within a country, has fallen from 52.8 in 2000 to 44.4 in 2017 (which is the most recent data in World Bank). Although there has been an improvement, the improvement is from very high levels of inequality. Chile is still considered widely unequal. For example, it is the most unequal country in the Organization for Economic Co-operation and Development (OCED), and its income gap is 65% wider than the OECD average. OCED is mainly made up of developed nations such as United States, France, the United Kingdom, and Germany. Some point to the fare raises as the ignitor to the protests, but a minuscule increase in subway fare would possibly not be important without a larger context and reasoning.

Research Question

The Santiago metro and public transportation system have undergone numerous iterations and changes. Since its inception, Transantiago has been the largest transportation system and is viewed as inadequate, ignoring the working-class population who most needed access to

[4] All currency is in USD unless otherwise stated.

transportation services. Transantiago, or the Red Metropolitana de Movilidad began in 2007. The World Resource Institute, a global research non-profit organization, claims it to be the most ambitious transportation reform by a developing country (The Slow Lane, 2008). Its goal was to standardize bus routes and remove redundancy, as the bus system was run by independent bus operators. It failed concerning usability and functionality and drastically increased commute times. Therefore, many more policies and changes were implemented to try and compensate.

This research study investigates, how do transportation policy inequalities, including Transantiago, affect communities of the Metropolitan Region of Santiago, and their impact on protest activation? I hypothesize that the policies or changes have disproportionately negatively affected the lower/working-class communities and therefore are one of the likely or potential causes of protests.

In this research paper, I first begin with historical background concerning Chile, Santiago, and the Metro. The next chapter is my literature reviews of transportation and inequality, and contentious politics and public transportation. Here, I start drawing the connection between these themes of inequality and transportation policy, and political protest. The next sections are the empirical analyses of the metropolitan transportation data to compare comuna-level inequality and its spatial distribution within Santiago. This empirical analysis sets the stage for examining how transportation inequalities map onto the geography of political protest targeting the metro system. The conclusion reviews the main argument and limitations of the study.

CHAPTER 2: THE CHILEAN CONTEXT & THE CREATION OF THE METRO

Santiago, Chile's capital city, has an estimated population of over 7 million, 35% of the country's population. The Metropolitan Region of Santiago is divided into 36 political districts, also known as comunas (Territorial Organization, 2014). Each comunas has their own mayor, city council, and vary widely in wealth. Comunas can be somewhat compared to counties or municipalities in the United States. The overall division of Chile is 346 comunas, which are then grouped into 56 provinces, then 16 regions. Therefore, in the state of Metropolitana there are 5 providences, and inside of the providence of Santiago there are 36 comunas, and this is where I focused my research. Each of these different areas is somewhat distinctive and each has their own sense of community and culture. While not an exact comparison, one might in a similar way have a foregone conclusion on someone from the Bronx, New York versus Manhattan, or Long Island. People are more likely to share complaints and discontentment with people in their same comuna because they have similar experiences concerning transportation. This is important for the wider context of this research because in a perfect world people should be treated equally in Santiago concerning public services no matter what comuna they live in. But what I am seeking to research is if there is inequality of public transportation access on the comuna level. If they are not receiving equal service then this could be one of the main causes of protests.

To further add to the context of public transportation in Santiago, it has been a series of regulations and deregulation, then back to regulation. Since its inception, public transportation has included tramways, trolly, trains, buses, colectivos (shared taxis with an established route), and the metro. When public transport first began it was not under government control or regulation. It was mainly made up of tramways from international investments. Along with the tramways an unregulated owner-operator bus system.

Pre-Transantiago

In the 1940s the government nationalized the tramways to try and stop their deterioration. The National Bus Transport Company was created to try and monopolize public transportation and buses. But towards the end of the decade but the bus system continued to expand as tramways went away as they were replaced by diesel buses and trams (Morrison 1992). Throughout the 50s and 60s, some of the small bus operators changed to owning several busses but still, not much was state-organized. The buses usually ran where the bus drivers decided to go (Morrison 1992). Before this, public transportation consisted of foreign tramway systems and an owner-operator bus model.

The planning for the metro began under Presidents Eduardo Frei Montalva and Salvador Allende. Under these two leaders, the plan for the metro was for it to both serve the working and middle class (Chastain 2019). Frei was the leader of the centrist Christian Democratic Party while Allende was the first democratically elected socialist president in Latin America (Figueroa 2012). While their more socialist policies impacted the planning of the metro, this changed by the time of the opening of the metro under the Pinochet dictatorship in 1975. Under Pinochet, the metro focused more on serving the wealthier users to make a profit. At this point, there had still not been any re-integration of the bus system. Pinochet solidified his neoliberal policies through the metro and did not follow through on the initial goals of the planners of the metro.

During the 80s, transportation moved into a deregulation era consistent with a push nationally to neo-liberal policies (Figueroa 2012). Transportation was framed as a “market” rather than a service. From 1979-1991 there was a systematic deregulation process that led to near-complete operational freedom (Figueroa 2012). The application system to be an operator was flexible, granting near every applicant's approval. The fares were the decision of each

operator. In 1983 the entry of new vehicles into service was forbidden. This lasted for 4 years until the Ministry of Transportation legalized free entry and withdrawal into the bus system. At the same time, operators were free to serve any route without authorization.[5] Concerning the metro, during this time it grew with around 8 extensions before the end of the dictatorship (Figueroa 2012).

At the end of the dictatorship in 1990, the transit system was very segregated between those who could pay the high metro prices and those who rode the private buses, which were less expensive (Figueroa 2012). From 1991 – 2007 there was a re-regulation of the bus transport with the return to democracy (Figueroa 2012). The focus in the early 2000s was to modernize and upgrade the system. The bus system was being criticized as inefficient and dangerous, while the metro was being criticized for redundancy with some of the bus lines.

This leads us up to 2007 and Transantiago. There were a few major problems that Transantiago aimed to fix. One, drivers were paid based on the number of passengers rather than being on time or distance they drove (Munger, 2008). This led to the drivers competing with each other to pick up more passengers. The drivers were responsible for taking tickets, making changes, and driving all at the same time. This caused Santiago to have the most fatalities of pedestrians in Latin America, 700 pedestrians per year (Blazquez, Lee, & Zegras, 2016). Fatalities of pedestrians affect more people of the lower and working class because people in the upper class generally have more access to private transportation. Citizens were upset about the "rude and aggressive bus drivers," creating overall dissatisfaction (Munger, 2008). But importantly, some citizens had strong opinions about the "planners" who ran the city agencies

[5] The number of buses in the public transportation fleet almost doubled between 1977 and 1989.

who only made routes people "wanted" with little standardization and the injustice to the different levels of service (Munger, 2008). Citizens were unhappy and seeking and comprehensive and cohesive plan. According to the "The Operator's Story: Notes from Santiago Case Study Interviews" conducted by The World Bank, "Transantiago was clearly such a true need…there was such chaos" (Floyd & World Bank Group 2017). The metro developed from what was left by the bus system. In the 90s buses were still the backbone of transportation. Integration of the bus system physically in terms of fares was not prioritized or integrated into the new system until Transantiago.

Enter Transantiago in 2007. Nearly overnight on February 10th, the new "planned" system went into effect. The unintentional consequences were seen immediately. It cut the number of mass transit riders, increased congestion, and tripled the average commute times from "forty minutes to two hours" (Munger, 2008). President Michelle Bachelet said in a speech on March 26th, 2007, "It is not common for a president to stand before the nation and say 'Things haven't gone well…. But that is exactly what I want to say in the case of Transantiago…. The inhabitants of Santiago, especially the poorest, deserve an apology." (McCarthy, 2007). Where the old system made roughly 60 million dollars a year, the new system began to lose money. Not many people were happy, and some even took to the streets to protest. In *"The Operator's Story"*, they interviewed several "operators" of the Santiago Metro, including CEOs and directorial staff. This has provided an in-depth look at the motivations and shortcomings of the metro.

The Metro & City Planning

Public transportation is not the sole focus of any government and it is to be expected the government cannot devote all of its money or resources to the metro or public transit. Numerous other important issues affect the citizens of Santiago and Chile, and although I do believe that the

metro is representative of larger problems in the country, I recognize that the metro, while it is a problem for the government, may not be their number one focus. I also believe that transportation will be important for the region to fix the larger problems of inequality, even though maybe not everyone sees inequality as a problem. Public transportation is necessary and fixes more than one problem. High functioning public transportation helps to keep street congestion low, which helps in accident prevention and reduces commute times. A reduction of commute times offers many benefits but also will increase citizens' quality of life because it gives them more time to do more productive things besides sitting in traffic. Less congestion also means less air pollution, which is a problem for Santiago because it sits in a valley. Public transportation can save money for the citizens while also increasing mobility for people across the city.

Similarly, with presidential elections every 4 years, the president can choose a new CEO of the Metro de Santiago[6]. And according to the interview in *The Operator's Story*, there is often turnover among top management that is very disruptive. With the president having sway over the metro there has been no clear vision over time. The relationship between the government and the Metro de Santiago is described by the interviewees as the government "trust us" in the day to day but the government does step in when there are "big" problems. The metro can act autonomously for any decisions that do not involve funding from the government. The big decisions are often the more important emphasizing the government's power.

The greater Santiago area is not overseen by a single governing entity but instead, the decisions making is split between the providence level and the regional level – both of which are

[6] President in Chile were elected every 6 years up until 1990 with the election of Paricio Aylwin. Aylwin served for 4 years, but the Eduardo Frei served a 6 year term. The same was true for Pres. Ricardo Lagos. However, since Michelle Bachelet started her term in 2006, elections have been every 4 years.

under substantial control by the national government. For example, the head of the region is appointed by the president. With so many levels of bureaucracy, there has not been a cohesive and universal vision and plan for the city or the metro. As a result, even though Santiago is the most important city, and is the most populous, the government has to provide funding to other states and regions. This is more a fact of the situation than a cause to blame the government. It would be beneficial to the region to have an entity committed to city planning, and planning a city that prioritizes equality.

Furthermore, Santiago does not have a City Development Plan or any meaningful integrated transport plan. This has caused a poor integration of land use and has left the planning in the hands of the private developers of the projects, who expectedly build where profitable, using the ratios. Floor area ratios are the relationship between the total amount of useable floor area that a building has and the area of the lot where the building is located. A higher ratio would indicate a dense or urban area. In the last 30 or so years, floor area ratios have become more popular as an alternative to zoning. The use of floor area ratios relates building bulk to lot area while giving the developer some freedom from traditional controls and zoning laws (M. Noble, A Noble, and Costa 1993). Some criticism of this method is that it is driven by market forces and does not have any wider aim of cohesion (Dunny, Plater-Zyberk, & Speck, 2000)[7]. As a result, the "upmarket" areas have been steadily moving towards the east with low-income housing being westward and outward of the city center. Contractors will keep building up an area because that is "where the money is", which further adds to the congestion and economic benefits in that area instead of having a more well-rounded city. While there is the fact that the metro being built

[7] Duany, Andres; Plater-Zyberk, Elizabeth; Speck, Jeff (2000). Suburban Nation: The Rise of Sprawl and the Decline of the American Dream. New York, USA: North Point Press. ISBN 978-0865477506.

where the people are, the other side is also people going where the metro stations are. And as I found out in my empirical research the metro has not been evenly distributed by population distribution, but more along the lines of wealth.

The approach by the government of a market-led development of metro growth has "arguably overconcentrated demand around Line 1". Line 1 carries around 40% of the metro's occupancy. Line 1 is extremely overcrowded and when Line 1 is disrupted it can affect the entire metro. This is one of the many tangible effects of the lack of planning. Integrated land use and a plan could have lessened the rapid development around Line 1 and distributed development throughout the city more. This would also be valuable for the metro, because increasing the accessibility to the metro in other areas may also increase demand. Further, it would have benefitted the city and region as a whole, increasing people's access and quality of life by increasing access to education and employment, which many times involves travel, for example, higher education.

CHAPTER 3: TRANSPORTATION & INEQUALITIES' PROTEST ACTIVATION

Importance of Transportation for Inequality – Literature Review

While researching how transportation policies have affected the comunas of Santiago, it is important to first establish that there is a connection between inequality and transportation. There are a few theories and concepts that I believe will help answer my question, this includes research on social mobility, the barrier effect, and commute times.

As previously mentioned, inequality has been an ongoing issue in Chile. There is some research on why transportation is important for inequality and social mobility. Social mobility is defined by the OECD as the movement of individuals, families, or households within or between social strata. Different levels of socioeconomic status, as well as the ability to advance, are tied to inequality. The Russell Sage Foundation's (RSF) research shows that "Countries with higher rates of economic inequality tend to have greater intergenerational persistence of advantage and, by implication, lower social mobility" (Russell Sage Foundation, 2016). Socioeconomic status can be determined by assessing, according to the RSF, one's occupation, education, income/earnings, or wealth.

Scholars argue that the reduction of poverty and inequality is more important for society than social mobility. This is because an increase in social mobility would possibly make the gap between the poor and rich larger. While people move up to high-paying jobs, unless there is also an increase in the number of jobs, people will also move down the economic scale, meaning that different people are poor. While a significant poverty reduction would be more effective to increase equality. Overall equality should be valued by society because everyone benefits, according to the Institute for Policy Studies. They state that "Countries that have chosen to be

more equal have enjoyed greater economic prosperity while also managing to develop in a more environmentally sustainable fashion." (Dorling, 2017).

The theories around why transportation is important for inequality or social mobility are still developing as new research has emerged in the last few years. A study conducted by Harvard in 2015 on upward social mobility entitled, *The Impacts of Neighborhoods on Intergenerational Mobility: Childhood Exposure Effects and County-Level Estimates*, shows that the single strongest factor in escaping poverty is commuting time. They demonstrate that "the longer an average commute in a given county, the worse the chances of low-income families there moving up the ladder." (Bouchard, 2015). This was measured as one factor in a larger study, with the variable being commute time less than 15 minutes. Below-median families' income increase by about 7% over twenty years if they had a commute time of fewer than 15 minutes (Chetty & Hendren, 2015). Interestingly, commute times caused an increase in males' income by 10%. Chetty does raise the point that while there is a correlation it is possible not because of the direct effect of being closer to jobs but some characteristics of "places correlated with commute times that drives the underlying pattern" (Chetty & Hendren, 2015).

Chetty & Henderson's studied the impacts of neighborhoods on intergenerational mobility research was completed by observing "commuting zones", which include the city and its surrounding suburbs, to encompass people who commute into the city. I believe their results on the importance of commuting time for escaping poverty can be applied to the Santiago Metropolitan Area. This research shows that the relationship between transportation and social mobility is stronger than other factors and social mobility, such as crime or school test scores. A high functioning metro and public transportation system is a positive step to give citizens a better chance of changing their socio-economic status.

The Barrier Effect outlined in "Traffic Barriers and Pedestrian Crossing Behavior", refers to the disadvantages motor vehicle traffic imposes on non-motor vehicle travelers such as pedestrians and bicyclists in terms of delay, discomfort, and lost trips. In short, the barrier effect turns walking trip distance into a motor vehicle trip, incurring higher costs for users and society. Zegras states “The barrier effect is closely related to equity issues…because the most affected peoples are typically more vulnerable and disadvantaged populations, including children, the elderly, and the handicapped” (Zegras, 1997). J. P. Braaksma, in “Reclaiming the Streets”, states that “Enhancements of traffic flow almost always degrade the pedestrian environment by increasing danger and/or by making walking inconvenient” (qtd. in Zegras 1997).

Zegras specifically points to how school-age children could be affected by an increased dependence on automobiles. For example, in the UK the number of children walking to school on their own has decreased from 80% in 1971 to only 9% in 1990. This is attributed to motor vehicle accident risks (Zegras, 1997). A specific example the article presents is a New Jersey school, whose parents requested “courtesy busing” because while they lived too close for regular bussing the children were facing traffic hazards when walking to school. This is an example of the barrier effect turning a walking distance trip into a motor vehicle trip and created a self-reinforcing incentive for non-drivers to start driving (Zegras, 1997).

In Santiago, the barrier effect is likely to represent some annual costs. Research of the barrier effect in Norway and Sweden has estimated that approximately $112 per capita (Zegras, 1997). This number is greater than the estimated cost of noise and almost equal to the cost of air pollution. The same is theorized to be true about Santiago, particularly due to the large number of pedestrians faced with crossing wide avenues. Both automobiles and buses are the cause of the external costs, but also the above-ground portions of the Metro. Zegras scales the results of the

research done on the Scandinavian countries to estimate that the costs of the barrier effect would be $.002 per vehicle kilometer in Santiago. One of the other factors of these costs is people's time, and this can be tied to commuting time. If more cars on the road increase the time it takes to travel between destinations, it will then be increasing commuting times. At the same time, it also increases personal cost, where a walking trip would be free, a trip on a bus incurs a new cost to households.

What I have discussed in this section will be beneficial when encountering policy or changes that increase the number of vehicles on the road or improvement for cars because this almost always hurts pedestrians or bicyclist traveling experience. Further, this could affect those in poorer areas more because of the wealth inequality from richer areas to poorer areas. As we will see later in the data in Santiago, the people who live in the richer comunas are more likely to have a personal vehicle, so it is arguably even more important for public transportation to serve those in lower-income areas. But at the same time, public transportation needs to be efficient and serve all people so more cars are not on the roads. There is a balance that can be reached between these sides. While the inception of the metro did have goals to achieve all of this, Santiago has fallen short in execution.

Contentious Politics and Public Transportation: Relative deprivation Literature Review

In Why Men Rebel by Ted Gurr, he explains his theories around contentious politics and relative deprivation. One of the main focuses of the book is the psychological frustration-aggression theory which maintains that the main source of the human capacity for violence is the frustration-aggression mechanism. It is not always the case; sometimes frustration does not lead to violence. But when frustration is strong and prolonged, it does result in violence eventually.

To describe the discrepancy between what people, think they deserve and what people think they can receive, Gurr created the phrase “relative deprivation”. Gurr hypothesizes that "The potential for collective violence varies strongly with the intensity and scope of relative deprivation among members of a collectivity."(Gurr, 2011, p.24). However, Gurr does not look at an objective indicator of deprivation, stating that people can become entrenched in a bad state of affairs – even if they are receiving little access to resources, including famine. Nevertheless, if there is a significant inconsistency between what they think they deserve and what they think they have, there is a likelihood of violence. This includes situations where their basic needs are met. While in the case of a repressive state it is depressive, the second example of relative deprivation is more frustrating. According to Gurr, just as frustration produces aggressive behavior on the part of an individual, so too does relative deprivation predict collective violence by social groups.

Frustration is not the only variable that can lead to violence, others include the social, political, and cultural environment. Many countries in Latin American, including Chile, have a “protest culture”, which is supported by research by the Americas Barometer (Moseley & Moreno 2010). In the article *The Normalization of Protest in Latin America* by Mason Moseley and Daniel Morena, they compare the perception of protests over time in Argentina and Bolivia. Although their analysis is focused on those two countries, they do argue that their conclusions could apply to similar countries in Latin America. The reason they present for the “normalization” of protests is that it has been shown to be successful, “In many Latin American countries, street protests and marches have come to play a crucial role in citizens’ efforts to influence government actions and policies, in conjunction with other more conventional forms of participation” (Moseley, and Morena, 2010). Furthermore, protests have been successful in the past showing citizens they have a path to change in the government through contentious actions.

The "Grand Plan"

I hypothesized that the metro policies have not been working to serve the unwealthy population in Santiago. The work of Gurr supports my hypothesis because with Santiago we can see the relative deprivation of the west versus the east sides of the city. Further, Santiago has seen this uncompleted "grand promise". As you can see in the following map, in the early 2000s there was a grand plan that the metro would have more universal service by 2020, when in reality that has not come to fruition, further increasing frustration for the citizens (Figure 1). This is also because the parts of the metro that have been built-up, have been in the Eastern side of the city. While a government not living up to promises is nothing new, it still gets citizens' hopes up. Then when that promise is not fulfilled people get frustrated and may take action, such as protesting when they feel their demands are not being met.

To connect this with political activation and protests, if there was an unequal development of the metro in Santiago there would likely be a correlating protest. This is because Chile does have a culture of protests being "normal". The relative deprivation from Gurr is also relevant because inequality usually shows you what other people have that you do not. In the case of the metro, this is displayed by building up around Line 1 and prioritizing that over creating a metro that services a large scope of people. This will be explored further in the later chapters.[8]

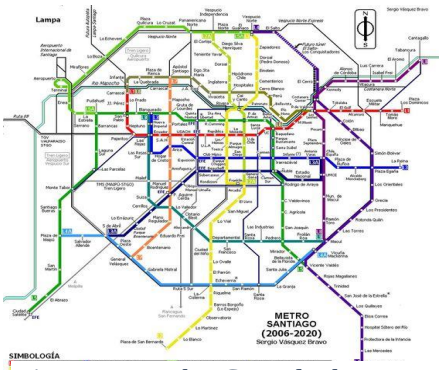


Figure 1 - "The Grand Plan"

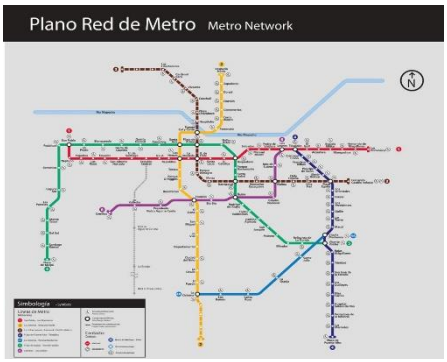


Figure 2 - 2020 Metro Map Reality

Larger images are located in the appendix.

CHAPTER 4: COMUNA LEVEL TRANSPORTATION INEQUALITY

To support my hypothesis that unequal public transportation outcomes can help facilitate protests, in this section I will be looking at comuna level data and their spatial inequalities. This will serve to measure the inequality between comunas and regions across the metropolitan area of Santiago. In this paper when I speak of the "region(s)" I am referring to how most literature defines/divides the comunas into the sector, as a way to demonstrate differences across the city. Not to be confused with the Regions of Chile, which there are 16 of in the country. Following this paragraph, there is a map to visualize the regional division of the city, but it is straightforward, North, East, West, South, Central, Southeast, and Southwest-extension. I have only used the extension of the southwest area in some of the charts because it is not part of the 32 main comunas of Santiago. To do this, I will be comparing the cars per household of the comunas that are serviced by Line 1 against the cars per household that are not a part of Line 1. As well as comparing the % of people who work in a comuna different from the one they live in, thus having a longer commute time and a need for transportation to work. Lastly, I will present the travel times on public vs private transportation.

Figure 3 - Divisions of Santiago by Regions

Vehicles per Household

In Table 1 and Table 2 the data is from "Informe Ejecutivo: Encuesta Origen Destino de Viajes", this survey was conducted in 2012 by the Social Observatory at Alberto Hurtado University (OSUAH) from a governmental mandate from the Ministry of Transportation and Telecommunications. They surveyed the greater metropolitan area of Santiago, they estimate that Santiago has approximately "6.5 million inhabitants, with an estimated 1,160,000 private vehicles, 6,300 vehicles, 6,300 urban buses, 27,000 basic taxis 27,000 basic cabs, 11,000 Colectivo[9] cabs, and five metro lines with 104 km of track." (OSHUAH 2012)

This project consisted of surveying all residents of 18,000 households in Santiago, randomly selected, in the period between July 2012 and November 2013. Its objective was to determine the characteristics of the trips made in the city and of those who make them. The survey was conducted through a personal interview and the data was collected on weekdays and weekends, during both the normal and summer season. The normal season is referring to regular non-holiday working days/times. In total, around 60,000 people were surveyed. The survey results also delve deeply into the time people are traveling and for what reason.

Furthermore, they conducted this study by visiting each residence twice. The first was aimed at presenting the survey, conduct the basic household survey, and assign the day of travel registration. During this visit, each person was given a travel diary as a reminder an information booklet with the assigned day of travel. The second visit was aimed at collecting the travel information personally applying the form to each member of the household, which generally

[9] Colectivos are a shared taxi with a specific route, able to be publicly accessed but generally cost more than a bus ticket.

meant making up to three visits to the household to locate all members of the family group. It is based on this methodology that I have high confidence in the value and results of this survey.

Table 1 is comparing the average amount of vehicles per household in different categories. I am comparing vehicles per household because for the most part it can be used as a wealth measurement. While people who live closer to the center of the city may not own a car because of the walkability of the area, the wealthier someone or a family is the more likely they are to have a car. While this is a wealth measurement it is especially useful because it is a mode of transportation. Instead of using household income (or similar measurement), cars per household speaks to wealth and personal transportation access. The first step was categorizing the comunas into which metro lines they were serviced by or if they had no metro stops at all (Table 1). Then I found the average number of cars per household for each of the categories listed in column one: comunas served by that metro line, comunas that do not have any metro stops, comunas that are serviced by multiply metro lines, and lastly, an overall average of all the comunas. When dividing the comunas by which metro they had access to, I included any comunas that had 1 or more stops in their borders. This is because while the entire comuna may not have close access to the metro they are still able to receive the benefits. Also, one of the critiques of Transantiago and the current plan is that they made several of the bus routes run on top of the metro routes, instead of diversifying tier reach. This further shows the benefit living near the metro has.

The data for cars per household is from a project the “Observatorio Social” conducted in 2012. For this reason, all of the comunas are included in the lines they had at this time. This only eliminated the 2017 Line 6 extension and the Line 3 extension in 2019. However, between both

of these extensions, they only brought in 3 comunas that did not previously have any access to the system, Cerrilos, Conchali, and Pedro Aguierre Cerda.

In this sense, I am not only using vehicles per household as a measure of personal wealth, but also the reliance on other forms of transportation besides private motorized transportation. In a general, the eastern part of the city is the wealthier side, with the Western side being the poorest. There are comunas, such a Providencia, that have low levels of poverty and high wealth, but may not necessarily have the same number or need for vehicles because it is centrally located, having both close access to public transportation, and a very walkable area to work, school, or stores. In the eastern and western areas, people need transportation to or from work if they work outside of their comuna. The largest areas of economic activity, and thus jobs, are in the center, so people on the outskirts would have to travel further into the city to have access to the best/most jobs.

Table 1 - Average amount of vehicles per household

Serviced by:	**Vehicles per household**	**# of Comunas**	**Population**
Line 1	.71	5	1,020,157
Line 2	.48	6	1,146,225
Line 3	.44	1	210,410
Line 4	.76	7	1,580,043
Line 4A	.41	4	656,506
Line 5	.558	10	2,290,948
No Metro stops	.59	10	1,137,910
Multiple lines	.665	6	1,424,629
Total average	.59	32	

Vehicles per household only begin to explore the resource inequalities between the comunas. One other way to compare the economic capacity is to use ECI. ECI or Economic Complexity Index is a measure of the productive capabilities of large economic systems, usually cities, regions, or countries. In particular, the ECI looks to explain the knowledge accumulated in

a population and that is expressed in the economic activities present in a city, country, or region. To achieve this goal, the ECI defines the knowledge available in a location, as the average knowledge of the activities present in it, and the knowledge of an activity as the average knowledge of the places where that economic activity is conducted. Higher economic complexity as compared to the country's income level drives economic development (Harvard, 2018).

Now to compare some of the ECI numbers for the comuna level of Santiago to add to the inequality described by vehicles per household. According to the 2017 census results the comunas with the highest ECI, are comunas such as Santiago and Providencia. Santiago (which is the central most comuna, not to be confused with the city as a whole) has an ECI of 4.38 and about 47,737 businesses. Providencia has an ECI of 3.54 and about 46,310 businesses. In comparison, the lowest numbers can be found in Renca with an ECI of .49 and only 2,127 businesses. Further, Renca has a labor force of about 95,00, and with 2,000 businesses they do not hold the economic diversity to support that much of the labor force.

One of the overall narratives of the metro is that historically Line 1 has been the focus of resources, so the fact that they have more cars on average is very interesting. It can be argued that they do not necessarily need public transportation as much as other areas that do not have access to more private transportation. Line 1 originally was in the center, as it was the first part built (1975) and started in Lo Prado, but since then there have been 3 extensions, all of which were eastern advances. The extensions in 1977, 1980, and 2010 were into the richest comunas, Providencia and Las Condes. Further giving the easter part of the city an unneeded advantage. Currently, Line 1 is the most extended into the eastern side of the city, and the furthest it goes westward is still the original metro Line 1 that started in Lo Prado. This further creates

frustration in other areas of the city that have little or no access to the Metro when they were told the Metro will try and serve all citizens.

While Line 1 has received a lot of focus and effort, for comparison, Line 5, which is the most westward reaching line was opened in 1997. Since then, there have been 5 extensions, that includes 20 new stops, 19 of which were part of eastern extensions. Since the inception of Line 5, they have only added one more stop to the west side, solidifying the priorities of the metro to service the areas based on the floor area ratios discussed earlier, which have been criticized because they can be motivating for profits and not cohesion. Further, the eastern area of the city that has received the majority of the metro expansions has about 500,000 people less than the western region of the city. So not only are they building to service an area that has private transportation but also a small percentage of their overall constituency. Floor area ratios have pushed them to build in the eastern areas because of the higher capital in that area, and because they are further building up the east it continues to get richer.

The comuna with the greatest number of cars per household is Las Condes, with 1.31 cars per household and 135 cars per 1000 people, (the second-highest in Maipu with 77 care per 1000). Las Condes is one of the comunas parts of the original Line 1 and the comuna that received all of the Line 1 extension in 2010. It is important for a universal well-functioning system to dimmish the number of unneeded cars on the road. While the eastern region does have access to more transportation, they are still taking more private trips. From Las Condes, 54.4% percent of trips are taken using private transportation, the average is 28% for all of Santiago.

Furthermore, Line 1 only services 5 comunas versus Line 5 which services 10 comunas. Line 1 and Line 5 both have 27 stops along their routes even though line 5 is longer and services a wider area, making its stops more spread out. Also Line 5 services about twice the number of

people as Line 1 (Table 1). The more spread-out stations mean people are more likely to need a secondary mode of transportation, such as a bus, or having to walk further on foot. Both of these would cause incurring costs in time and a monetary increase from possibly having to pay two fares[10].

The expansion of Line 1 supports my hypothesis that the metro has been serving the wealthier areas of the city because comunas around Line 1 have more vehicles per household. If there was a well-intended planning committee the contractors might have built elsewhere to service a more unreached area, but this did not occur and would have increased frustration. By building up Line 1 the Metro de Santiago has continued to pour resources into the same areas, increasing the spatial inequalities.

Number of Transportation Trips Taken

Another way to look at the ways the metro and public transportation affect inequality is to look at the types of trips taken and by who. The type of trip taken can be significant for a couple of different reasons. When someone is choosing a type of transportation to take, they would include factors such as time, accessibility, cost, and convivence. As mentioned earlier, usually persons take non-motorized transportation because of the cost associated with it. This sometimes is the environmental cost or monetary costs. The same is true when considered the choice between public and private transportation. The following section is comparing the percentage of trips taken on the different forms of transportation and shows the results of not having access to the metro.

[10] Although this was changed as part of the Transantiago reform, people do still have to pay two fares if they take a bus then the metro.

The same strategy was used with the data for the number of trips taken using public transportation versus private transportation, dividing the comunas into what type of metro stops they have. Table 2 is divided by types of trips are for the average working weekday and were divided into trips taken on public transportation, private transportation, non-motorized, and others. Private transportation includes personal cars, regular taxis, and motorcycles. Public transportation includes buses, metro, colectivos, train, and charter buses. The "charter buses" are mostly used for longer distances and usually only have one stop within a city. For example, if someone lived pretty far outside of the city then they might take one of these buses into the city on a daily or as-needed basis. Non-motorized is trips taken on foot or by pedal bike. The "other" includes trips taken on school buses, institutional buses, and combination trips of public and private. Since Observatory Social survey was conducted with a sample size of about 18,000 randomly selected households, the raw numbers for types of trips taken are not as useful as the percentage of total trips taken in each category.

Table 2 - Percent of Trips by Mode of Travel

Serviced by:	Public Transit	Private Transit	Non-Motorized	Other	Population
Line 1	24%	31%	40%	4%	1,020,157
Line 2	26%	23%	47%	3%	1,146,225
Line 3	37%	19%	38%	6%	210,410
Line 4	27%	38%	32%	4%	1,580,043
Line 4A	29%	26%	42%	4%	656,506
Line 5	24%	29%	41%	4%	2,290,948
No Metro stops	28%	28%	40%	3%	1,137,910
Multiple lines	25%	34%	38%	4%	1,424,629
Total average	29%	28%	39%	4%	Population

As shown in Table 2, the highest percentage of trips taken on public transportation, which also has the lowest numbers of private transportation travel is around Line 3. This might be

because Line 3 only services one comuna, Quilicura. Quilicura is also on the low end for cars per household and has some of the lowest private transportation usages, meaning they are probably taking more trips on public transit out of necessity. In comparison, the lowest number of public-transit is Line 1 and Line 5.

Also, of note is how comunas around Line 4 have the lowest percentage of non-motorized travel. This could be explained by both their higher-than-average number of cars per household, low amount of poverty, and also the location. Line 4 mainly services the east and southeast areas of the city. As previously established the east is the wealthier area. The southeast is not as wealthy as the northeast, but still has a higher average income than the western side.

While in the past two tables I have calculated the variable based on their access to the metro, the Social Observatory study used regions (of the city) as a way to divide the comunas. Both of these comparisons are important and provide different perspectives. The divisions based on metro line access is a creative way to compare different sectors of the city with the added layer of being able to look at extensions to lines, and the areas they affected. Santiago is very economically segregated and the following charts start to demonstrate that.

Table 3 - Region of Origin & Destination of Trips on Public Transportation

	Destination							
Origin	North	East	West	Central	South	Southeast	Southwest-Ext	External
North	54%	8%	10%	17%	5%	4%	0.3%	0.0%
East	5%	48%	13%	20%	6%	3%	1.9%	0.1%
West	7%	13%	37%	16%	8%	17%	0.8%	0.1%
Central	15%	24%	18%	12%	14%	13%	2.8%	0.1%
South	4%	8%	10%	15%	49%	11%	1.3%	0.1%
Southeast	3%	4%	19%	11%	10%	51%	0.5%	0.1%

Table 4 - Region of Origin & Destination of Trips on Private Transportation

Origin	Destination							
	North	East	West	Central	South	Southeast	Southeast - Ext.	External
North	53%	9%	17%	9%	4%	5%	0.6%	0.0%
West	7%	61%	7%	7%	9%	4%	1.2%	0.1%
East	5%	3%	75%	6%	3%	7%	0.1%	0.4%
Central	11%	12%	28%	22%	13%	11%	0.8%	0.5%
South	2%	9%	9%	6%	62%	7%	1.4%	0.3%
Southeast	3%	4%	17%	6%	6%	62%	0.4%	0.5%

To begin, in the case of public transport, the proportion of intra-sector trips is low, when averaging the number of trips taken to a different comuna from the data used to create Table 3. (42%). In contrast, private transport trips within the same sector constitute 62%. The East sector generates the largest number of private transport trips, with a much higher number than the other sectors. They also have a higher number of private vehicles as it is the "richer" area of Santiago. The easter area of the city is serviced by public transport than many of the other areas with similar populations.

For example, in the case of Pudahuel versus Las Condes, Las Condes is to the east of the city center, and Pudahuel is to the west. Las Condes does have a population of 295,000, 65,000 more people than Pudahuel. However, Pudahuel has a poverty rate of 8.25% with only 3 metro stops versus the .19% poverty rate in Las Condes and 11 stops. Pudahuel has about .43 cars per household whereas Las Condes has 1.31. Additionally, only 18% of trips from people who live in Las Condes are taken on public transportation, whereas Pudahuel is 32%. This further demonstrates the inequality between the haves and have nots, comunas, and regional differences.

Commute Times

Earlier I discussed the importance of commute times for social mobility. The highlights of this argument are that the closer someone is to higher-paying jobs the better chance they have to advance socio-economically. Other factors help such as education, but commute times (access) are one of the strongest. The following charts show the number of minutes trips take on a normal workday, the first table is for trips taken on public transit and the second is private.

Table 5 - Average Travel Times by Public Transport (Minutes)

	Destination							
Origen	Norte	West	East	Central	South	Southeast	Southwest – ext.	**Average**
North	48	75	82	55	91	95	109	59
West	72	44	83	55	69	86	77	57
East	80	86	44	45	94	71	132	62
Central	59	60	48	34	66	74	95	58
South	86	67	83	58	43	62	91	56
South East	91	84	65	68	63	42	98	55
Southwest-ext.	102	66	118	97	74	93	34	50
Average	77	69	75	59	71	75	91	57

Table 6 - Average Travel Times on Private Transportation

	Destination							
Origen	North	West	East	Central	South	Southeast	Southwest - Ext.	**Average**
Norte	30	49	51	51	58	61	87	41
West	49	23	53	38	35	52	56	31
East	46	50	22	36	45	48	59	28
Central	46	38	37	21	38	47	69	36
South	51	36	44	42	21	37	52	28
Southeast	69	51	45	49	33	19	72	29
Southwest-ext.	77	59	58	64	47	68	25	33
Average	53	44	44	43	40	48	60	32

These charts demonstrate that public transit average travel times are longer than private transit times by 56% in Santiago. The time working-class citizens need to spend on public transportation puts them at a disadvantage and costs them valuable time. Although the overall averages are not the best use in the specific case because it includes trip times from the outer reaches of the city, such as the "Southeast Extension", and so trips will naturally be longer coming from those areas, the point that private transit it faster still stands. Additionally, when private is faster people who have cars may be more likely to use their personal vehicles when the public transit is not optimal. We can see a case of this in how when Transantiago was instituted and failed, it increased the number of cars on the road and increased the number of cars on the road overnight. And this adds to the Barrier Effect, more cars on the road further slows down public transit and can cause more accidents and dangers for those using non-motorized travel. Transantiago increased the average commute time from 40 minutes to 2 hours (at the time). Although some of these effects have been diminished over time, the failures of Transantiago demonstrate the implementers' failure to understand what matters in public transportation.

One specific that I want to draw attention to is looking at how long trips take from the outer regions into the center, the center being important economically and has the largest about of industry. It takes people traveling from the east 10 minutes less on average using public transportation than from the west, even though both of them are the same distance from the center. This is probably because of the public transit system itself because it is 2 minutes faster to get from the west to the center than the East when using private transportation. The system continues to serve the upper class better than the lower class further putting them at a disadvantage.

Another interesting part is that some areas have little change, for example when traveling from the north to the center. With public transportation, it takes about 55 and with private 51 minutes, not a large difference. Citizens in this region did take more trips on public transit to the center region than private (35% more trips or 17% vs 9% of total trips taken on public vs private). The time for trips added to the more trips taken on public transit can be a sign that there is best public transit in this area. When looking in the north, it mainly serviced by Lines 3 and 4 and has more stops per capita than any other area outside the center.

One of the largest differences between public and private transportation times is between when traveling from the east, private transportation is 34 minutes faster on average. I find this interesting because it is larger than the differences for the other regions. I am not sure this can be solely explained because of geographic reasons. I think it would take a far deeper investigation to come up with a concrete reason. However, some of the possible explanations could be public transit comes with inherent waiting times for the next train or bus to come by. And because Santiago has also increased other infrastructures such as roads in this area it has helped with traffic and congestion. This lower average of commute times on private transport could speak to the overall investment of infrastructure in the eastern region over others to support my hypothesis that they have been better serviced by transportation.

In contrast, fares have risen by 40% since 2010 but bus journeys have slowed by 8% since 2012. This has increased citizen's commute times and will have created more frustration to set the stage for the protests. People had to keep paying more money to see little return on the quality of service. Especially since the fare increases have targeted the commuting times of day when people are going to work, trips that they are taking every day. This would increase the

amount of a family or person's income that is going to public transportation because for some it is the only way they can get to work.

To conclude, while I do not have any surveys that give exact numbers on why the citizens of Santiago take public transit over private, to start we can look at the inherent advantages and disadvantages of each. The main advantages of public transportation versus a personal vehicle are it is less expensive. There is no upkeep like with a personal vehicle, such as gas, parking, maintenance, etc. There are also environmental benefits but that is more collective and may not motivate all people. However, one of the main disadvantages to public transportation is you can only go to places public transportation allows, so with private there is more freedom. Public transport is also time-sensitive. You have to catch them when they're available. Which is more applicable to non-work trips that do not take place during the working day when there might be less transportation available.

To compare these motivations against the data in this section those who use private transportation over public do so because they have the economic liberty to do so. For example, 66% of the trip originating in the East use private transit. This can be compared to the 43% of trips that use private transportation when originating from the west. Even though the overall average of the trip times originating from the east or west are very similar. If you look at the time it takes to get to the center, there is a difference of 10 minutes (Table 5). If people used private transportation solely because of the time benefits we would have seen a larger percentage of trips taken using private transportation to the center from the west, but because they do not have always have the economic capability to do so they have to turn to public transportation. This dependency and need speak to the frustration of the citizens. For some people public transportation in the city is not an optional service and supports their livelihood, this stresses the

importance of public transit and why people would have the motivation to protest the changes in fares.

In this section, I have established the travel patterns, access, and commute times that vary from region to region, or comunas use. While this does show differences in the time it takes for trips because of that access to transportation, to complement this, in the following section I will be looking at inequality from a more economic measure, using poverty rates over time, as well as looking as some other measures. In total, the limited access to transportation, limited personal motorized transportation, or close access to public transportation, puts these underserved citizens at a disadvantage and in turn has effects on the greater inequality of the city.

CHAPTER 5: TRANSPORTATION'S EFFECT ON INEQUALITY & PROTESTS

Transportation's Effect on Inequality

In this section, I want to further compare the inequality between comunas and regions in Santiago and start to look at how transportation could affect these different sectors. To do this I will be comparing poverty over time-correlated to an increase of public transit access, to demonstrate the need for transit. One thing I want to bring back is the discussion earlier on the large price of the metro compared to other places in Latin America and for the median income in Santiago. For some spending money on the metro daily, especially during peak commute times when the metro is higher, may not be possible. So, in this sense that building more of the metro is not a clear solution to the problems I have discussed in this paper. And further, building more would likely be a cost that is passed on to the patrons and not one that is already built into the budget or subsided by the government. But I do feel this access is still a factor that can affect people's social mobility. By looking at a specific area and comparing it across Santiago and time, will help address my research question by comparing policy outcomes and changes against changes in inequality. And as a result, this would have further built up frustration in a group that feels often disenfranchised.

The following table shows the distribution of households across the levels of wealth. In this survey, they defined the levels as follows. For context, the median level of income per household is $2,225, and the international poverty line is about 57 USD per month (Pasquali, 2020).

- Low Income: Between $0 and $544 per month.

- Middle Income: Between $545 and $2179 per month
- High Income: More than $2180 and $8,200 per month.

Table 7 - Socioeconomic Status Distribution

Sector		Lower	Middle	Higher
North	Households	103,400	174,800	9,700
	%	35.9%	60.7%	3.4%
West	Households	179,800	231,400	99,000
	%	42.7%	55.0%	2.4%
East	Households	46,000	150,200	131,100
	%	14.1%	45.9%	40.1%
Center	Households	40,200	95,100	11,500
	%	27.4%	64.8%	7.9%
South	Households	160,200	190,900	9,500
	%	44.4%	52.90%	2.6%
South-East	Households	137,600	232,000	25,200
	%	34.9%	58.80%	6.4%
Southwest - Ext.	Households	55,100	56,400	1,400
	%	48.8%	17.2%	1.2%
Totals	Households	722,200	1,130,800	198,300
	%	35.2%	55.1%	9.7%

Initial conclusions from this data are that The Eastern sector is the one with the highest percentage of high-income households, while the South-West Extension sector has the highest percentage of low-income households. This complements the data in the previous section with cars per household. Increases in the cost of transportation would be felt more by the people in the lower-income areas because they have less disposable income and would be more motivated to participate in protests.

The eastern part of the city is obviously where the rich and “well” off people are. This brings to mind the argument that it is better to be poor in a rich country than rich in a poor area. So, the lower-income people in the east may still be better off than their compatriots in other

parts of the city because they have access to the same schools, jobs, and public transit that the rich people do in this area. There are other factors than just access and wealth is often generational, but it is better for people to have the opportunity than none at all.

Another comparison from this data is the distribution between the classes, while the middle class is the most populous there is not an equal distribution, and the distribution for this set of data is not equal. Interestingly the north, south, and west have very similar distribution between the levels of income. The larger number of citizens on the lower end of the scale created the mass numbers and shared frustration needed for the mass protests we have seen in Chile. In Santiago, the lower and middle class make up the majority, about 90%. If there was not this majority, we would not see protests on the scale they have been. When the public transit is late, not working, or slow, for the upper class this could be an inconvenience, but for the lower classes, this affects them more because they do rely on it. If the metro or a bus happens to not be working one day, a wealthier person would have more alternatives, such as a personal vehicle. And often hourly jobs or the "black" market may be more dependent on time, since they are not salary-based, creating higher stakes and thus more of a feeling of need[11].

While there is relative deprivation between regions, this can also affect people within the wealthier regions. For the lower-class citizens that live in the richer regions, while they may be able to share some of the amenities with the upper class, they can see close up what other people have (house, or cars), which would create relative deprivation, as they can see what they *could* have. Even with people who live on the other side of the city, there can still be this sense of

[11] For black market jobs, I am referencing jobs that are not in the regular economy, such as street vendor. If someone is late and is not able to set up in time, they may lose their spot and miss out on possible income. Whereas for someone in a salary position being late because of transit may have less consequences.

relative deprivation, and prolonged deprivation that can lead to the frustration to take civic or contentious actions.

Unfortunately, I was not able to find this specific breakdown of income over time, so in the next table I will be using the census poverty data to look at changed inequality over time and what effect policy changes could have had. I will be using both the regional breakdown of comunas and also the earlier method of metro access, specifically comunas that do or do not have direct access to the metro.

For example, Cerrillos is a comuna that was not serviced by the metro until the 2012 extension of Line 6. According to the Chilean Census, the poverty rate in Cerrillos was 15% in 2011 dropped to 6.81% in 2013, and then went up to 8.1% in 2015. While the poverty of the city as a whole went from 15.7% in 2011 to 9.2% in 2013 and 6.2% in 2015. The initial change in Cerrillos was greater than the change for the city at that time.

Table 8 - Poverty Levels by Year

Comunas Serviced by	2011	2013	2015	2017
Line 1	9.59%	5.86%	3.82%	3.26%
Line 2	14.01%	8.05%	7.13%	6.09%
Line 3	12.37%	9.24%	7.82%	4.59%
Line 4	11.70%	5.99%	3.80%	3.70%
Line 4a	15.60%	10.92%	5.83%	5.11%
Line 5	13.20%	5.84%	4.88%	4.29%
Line 6	NA	NA	NA	3.62%
No metro stops	16.23%	9.19%	9.03%	6.38%
comunas that have multiple lines	9.59%	5.33%	3.83%	4.16%
Average of all the comunas	15.70%	9.20%	6.20%	5.40%
Chile	22.20%	14.40%	10.41%	8.60%

In this table, I used a similar method as in Table 1. However, Line 3 was built in early 2019, so during the years of the chart, the comunas of Line 3 did not have access to the metro and are also included in the results for comunas with no metro stops. The same for Line 7, it was completed in late 2017 I also adjusted the comunas with multiple lines and the comunas with no metro access to take into account these changes. The case of Line 3 is especially interesting because Line 3 was originally supposed to open in the 1980s. However, the Algarroba Earthquake and some explosions in Puente Alto and Maipú put the construction on hold until the 2010s. It took over 30 years for citizens to get closer access to the Metro in the comunas around Line 3. The plans for Line 3 were postponed again and again in favor of Line 5, Line 4, Line 4A, and Line 6. The poverty around Line 3 is relatively low, but so are the comunas serviced around the other metro lines that were built instead of Line 3.

The data in Table 8, shows concretely that the lowest poverty levels are around Line 1, comunas that have been consistently prioritized by those in charge of metro and public transportation expansion. While those with no metro access have the highest levels of poverty. Comunas around Line 5 has the greatest decrease in poverty rates in these years, and of note, Line 5 had an extension open in 2011. While I cannot prove that the metro extension to Line 5 is the direct cause of this increase in poverty levels, I do believe that it was a contribution. As discussed earlier the opening of metro stops often brings economic gains to that neighborhood.

In conclusion, this supports arguments about the importance of public transportation and why it would create frustration for the citizens of Santiago that would eventually lead to political activation and mass protests. While it is not as easy as just build a metro stop in a poor area and all of their problems are solved, it would begin to solve a few and increase their quality of life.

Transportation & Protests

As to look at the effects of the inequality seen in Santiago caused by the disparities in transportation, in this section be look at a few specific protests concerning transportation or that targeted transportation, approaching them from a few different angles. First, I will be looking at protests by people who worked for the metro. This is useful because they are people who have a very close relationship with the metro system, understand the needs of the people who use the metro, and I think how the metro treats its workers can be represented with larger problems of the metro. If they are rejecting the needs of the lower on the chain workers, they probably feel similar about lower-income people. All of the protests I will be discussing are before October 2019. One is a bit earlier in 2015 while the other one occurred in March 2019; they both provide an understanding of why things became violent in October of 2019. The issues people have been having with inequality and the metro did not pop up overnight in October with the small fare raise but instead was an ongoing problem.

The previous sections show the prolonged relative deprivation and thus frustration many of the citizens in Santiago have had for a long time. So long that things came to a head in 2019 and they demanded a change in areas across the country. I want to bring back up the arguments of Andrea Chastain that the metro and public transportation system is a microcosm of Chile. So, if the frustrations of everyday citizens with public transit are similar to other areas such as education and health care, it is apparent why things got so volatile.

Protests by Metro Workers

There have been several protests/strikes by the workers of the metro, pointing to even more failures in the system besides the customer experience. For example, in August 2015, there was a large demonstration started at one of the major metro stations. Workers were demanding better working conditions “We are demanding minimum standards for the workers and also for

the passengers," Jorge Ávila, head of the Unified Santiago Metro Union, told a local newspaper (Jegroo, 2015). The summation of their requests was for overtime compensation. At the protest, they held up a sign that read "Because you deserve a decent transport, support us! We move Santiago!". Even 4 years before the national protests in 2019, we can see that there was already a common conscience of the people that they "deserved" a better transportation system.

While this protest was specifically focused on workers' issues, this protest demonstrates the long help frustrations that were one of the causes of the mass protests in 2019. Further, in many ways transit is a workers' issue. As the data and the Barrier Effect suggest, the people who rely on public transportation more are of the lower and working class (Table. The 2019 protests were nothing that developed overnight but years of these smaller frustrations and protests building the awareness and in the common conscience. "Today's demonstration spread a sort of awareness to citizens so that they are aware of the mistreatment of Metro workers due to unsafe policies," Daniela Pérez, president of the Unified Conductors Union, told Emol.com (Jegroo 2015).

Frustrations need to be shared for the mass amounts of people to show up and show support. Pérez states that "Despite the congestion in the station, many of the passengers at the station showed support to the workers and their campaign." (Jegroo 2015). This shows that people were not only learning about the frustrations of the workers but also sharing their own experience with the metro. When someone calls an Uber to come to their house and it is late, they might text a friend. But with the reportedly slow metro or bus, people can talk to the people standing around, even simple comments like "the bus (or metro) are late again", start building the frustration over years with the less-than-optimal system in Santiago. In this case of a specific

protest, the management of the metro was seemingly unresponsive and did not respect the workers' demands.

According to my research on protest in Chile in the last 10 or so years, it seems transportation has always been a lingering background issue. Not sufficient on its own, but it was a contributing cause in the larger 2019 protests. For example, in 2011 where there was a large violent student protest against the education system, BBC reported that one of the broader complaints was the transportation system (Long, 2011).

Non-Workers Protests

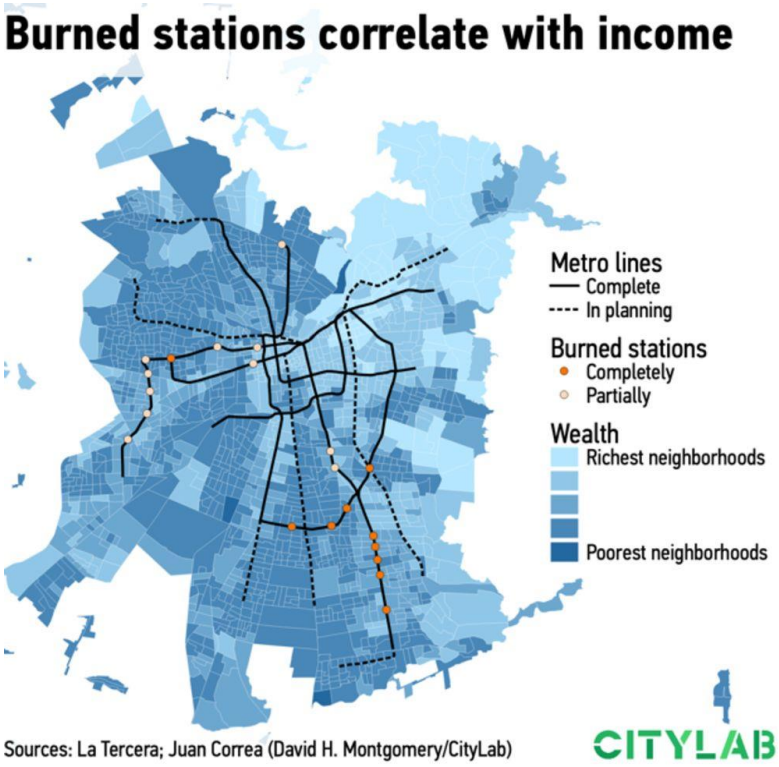
Initially, after Transantiago there were also numerous protests. According to local reporting in 2007, one of the protests was a student rally that turned violent. Also, with this protest, one article reported on what other areas of the country were thinking. For example, the parliament of the sixth region states that "When Santiago has problems the government doesn't have any problems opening their hands [asking for money], but when the problems are provincial, we don't see the same support. We need resources for drinking water, roads, education, and levees. We cannot permit that they take money from that which was already allocated to find a solution to the problems of Transantiago." It seems even in 2007 there was a national sense of frustration with the transportation system in Santiago, further setting the stage for the national protests to come.

Because the Metro is a representation of the government, the metro has long been a target for violence. For example, in 2014 there was a series of bombings that targeted the metro. On 8 September 2014, a fire extinguisher bomb exploded in the Escuela Militar metro station in Santiago, Chile, injuring 14 people, several seriously. Though no group or individual has

claimed responsibility, the attacks have been attributed to the Chilean Anarchist group, Conspiracy of Cells of Fire. The metro being a target for protests against the government adds to the argument that it is a microcosm of Chile and its decision-making. As these previous protests show, the metro was a symbol for the problematic decision-making of the government and a target for violence, before the explosion of pent-up frustration in 2019. When the protests began in 2019 over the metro, by looking back we can see this coming. Long-term frustrations about inequality had been brewing, and the metro is the perfect factor to ignite protests because of its symbolic significance of larger inequality.

The following map from CityLab shows the correlation between income and targeted attack on the metro during the October 2019 protests (Figure 4). All of the metro stops that were either partially or completely burned during the protests occurred in some of the poorest neighborhoods. Further, there was not a single station burned in the eastern part of the city or on the eastern part of Line 1. I believe this supports my hypothesis that the poorer communities have long been frustrated with their treatment and service by the government and the metro.

Figure 4 - Map of Burned Stations



The Pattern Continues

This could happen again if things do not change. For example, they are still considering raising the fare (La Nación, 2020). This shows that they have not looked deeply at what caused the protests in the first place. The metro has always been seen as a representation and microcosm of Chile and the government. While the process for a new constitution has begun since the protests in 2019, the problems with the metro have not changed. Most of the data I have used in my research has been either from the government directly or through government-sponsored projects. I would suggest that they use their resources and access to have a cohesive plan for the metro beyond raising the fare when needed.

However, as costs are rising, "at some point, there are going to be rate changes. If costs start to shoot up, obviously a decision will have to be made," the transport minister said without preamble. In early 2020 the “Panel of Experts of Public Transportation” announced two different fare raises and then as soon as protests started again, they canceled them (La Nación 2020). Two weeks after that decision, and after days of student demonstrations and worker protests, on Friday the 18th of that month, Congress approved the suspension of the increase.

Also, on January 20th, 2020, the Panel of Experts of Public Transportation determined a new increase of $10 for Transantiago. However, this time the government took less than a week to cancel the increase.” This shows an ongoing cycle that does not seem to be getting better. While Chile has started the process of getting a new constitution, I wonder how much will change. Even after the protests of October 2019, we are still seeing the same decisions for the metro, and will this be representative of the government as a whole. In the coming months, as the Constitutional Convention begins/continues, some of these questions may be answered.

CHAPTER 6: CONCLUSION

My study of the public transportation system in Santiago, Chile shows that the metro reinforces existing inequalities. While there could have been many factors that caused the mass protests in October 2019, the prolonged frustration with the public cannot be ignored. In much of the news coverage at the time, I think publications were too quick to dismiss the transportation frustrations, assuming all of the frustration was misplaced and was anger at the government, seemingly unrelated to the metro.

I choose this topic to write and research on because of my own experiences in Chile and Santiago. I was in Chile when the October 2019 protest took place therefore, I wanted to understand the circumstances surrounding the protests. As an international student in the country at the time, I did not have the same understandings that Chilean citizens had on the situation. I believe this research has expanded upon previous research and data to further contextualize the October 2019 protests and start to explain the frustrations of the Chilean people. And why it has been so frustrating to live in a system that serves to make the rich richer and the poor poorer in many ways. An optimal public transportation system would not only help the social mobility of its users but also increase the quality of life across the city.

The bus system (and other non-metro public transportation services) were not the main focus of my research and instead only served when the data was available and it added to the argument of this research. While the bus system is important and widely used by the citizens, the metro is more representative of the state. This is because it is more of a physical representation a metro stop takes up a larger presence in a neighborhood than a bus stop. Buying a new bus or

making a new bus stop does not occur the same costs as building a new metro stop. Because of this, the decisions about the metro are more focused on.

Key Takeaways

I believe that the data and research demonstrate how unequal the metro system has been in Santiago. It has been continuously built to richer neighborhoods, that have personal vehicles and do not rely on public transit as much as the poorer comunas. This long-term frustration and relative deprivation of the rich having more than the lower-income areas, the peak with the October 2019 protests. While public transit is one part of the larger public services industry it is an integral part and affects all citizens. In some ways, the protest in October 2019 was inevitable because of the prolonged frustration of the citizens and the seemingly unresponsive government when these frustrations were raised.

The idea of the metro was imagined under a very different political situation than when the building of the metro began. What first started as a project that would strive to equally serve all citizens under Allende became a symbol and actualization of the neo-liberal policies under Pres. Augusto Pinochet. Since then, policy and planning changes have changed from president to president, because of the power they have over the metro… One of the main examples is the use of floor area ratios in the planning and construction of the metro…

Transportation is important because of how it affects the city it serves and inequality. Firstly, it has been previously researched and confirmed that transportation access and commute times is an important factor in social mobility. With access to fast and dependable transportation, lower-income citizens have access to possibly higher-paying jobs located in other areas of the city than where they live. While it is not the only factor it is one of the most important. Further

equality should be valued by society universally because everyone benefits. Keeping people in poverty does not move a society forward.

Further is also can motivate citizens to take action. As Ted Gurr has documented in Why Men Rebel, a prolonged sense of frustration can cause citizens to take action. This is especially applicable to Santiago, Chile for many reasons. One being is there has always been a grand promise of a better metro system, but this promise has never become reality.

The survey data from the OSUAH shows the travel patterns of the citizens of Santiago in great detail. From the analysis of this data, we can conclude that public transportation has impacted the travel patterns of Santiago and thus has an impact on travel/commute times and inequality. Often the comunas with the highest percentage of personal private transportation have the highest number of metro stops and access to the central public transportation system. The access to metro stops around Line 1 continues the narrative the metro has been serving the wealthier areas of the city. This is because comunas around Line 1 have more vehicles per household. If there was a well-intended planning committee the contractors might have built elsewhere to service a more unreached area, but this did not occur and would have increased frustration. By building up Line 1 the Metro de Santiago has continued to pour resources into the same areas, increasing the spatial inequalities.

These inequalities are apparent in the differences in commute times, as trips on public transportation take an average of 56% longer than trips on private transportation. The time working-class citizens need to spend on public transportation puts them at a disadvantage and costs them valuable time. And while the time and quality of public transportation has not increased, the prices passed onto citizens have, creating even more frustration.

Before the mass protests of 2019, there were signals of what was to come. Some examples of transportation-inspired protests are ones by metro workers and bombings targeting the metro. All of the peek in 2019 when protests were sparked by the fare increase of the metro during commute times. During the protest about inequality, there were several burned stations, either leaving them partially or completely destroyed. While the protests have led to some change in Chile it is still to be seen if there will be substantial changes with the metro to make it more equal to all citizens across the city.

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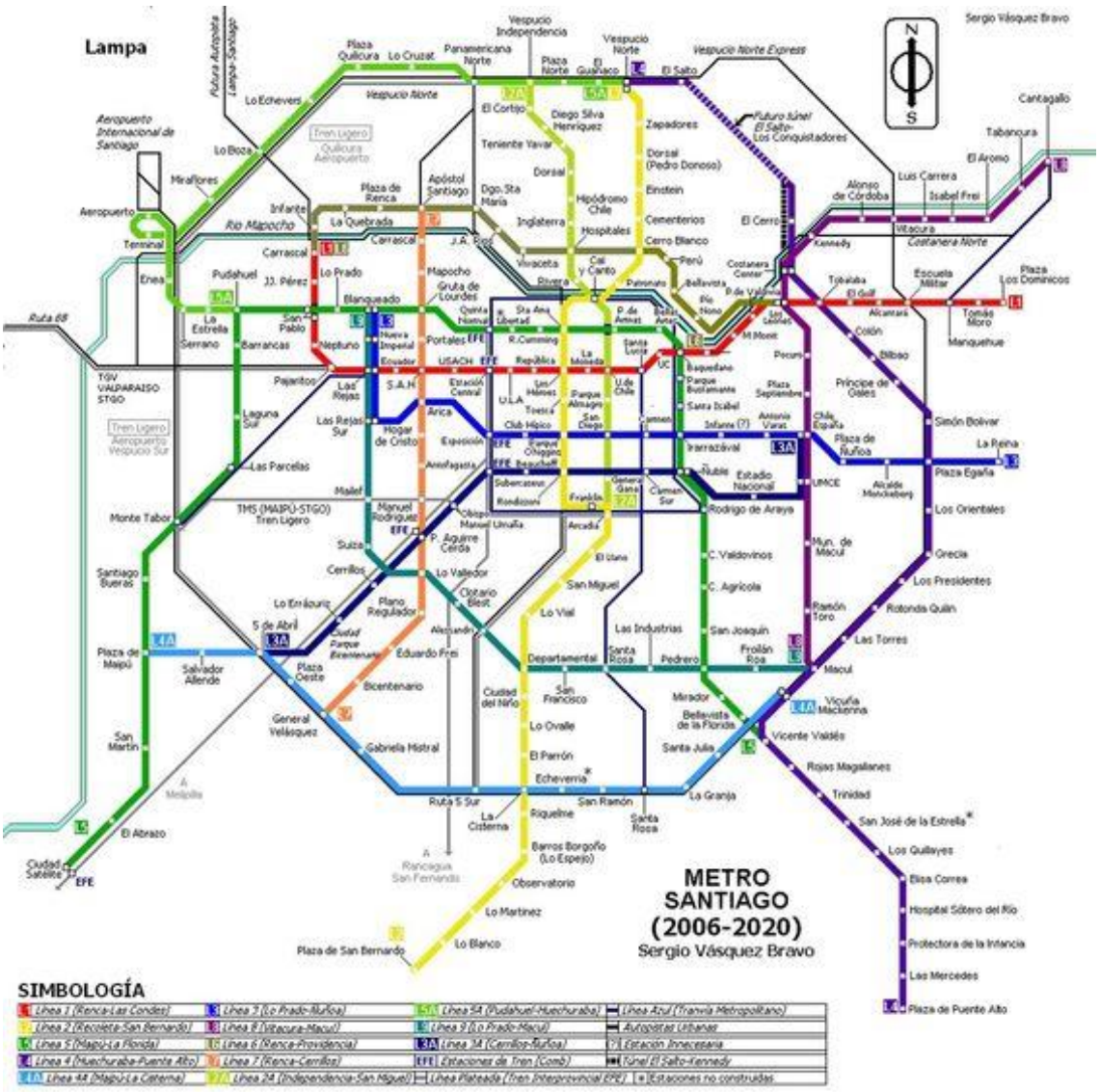
APPENDIX


Lampa
Sergio Vásquez Bravo
METRO
SANTIAGO
(2006-2020)
Sergio Vásquez Bravo
SIMBOLOGÍA

Plano Red de Metro Metro Network

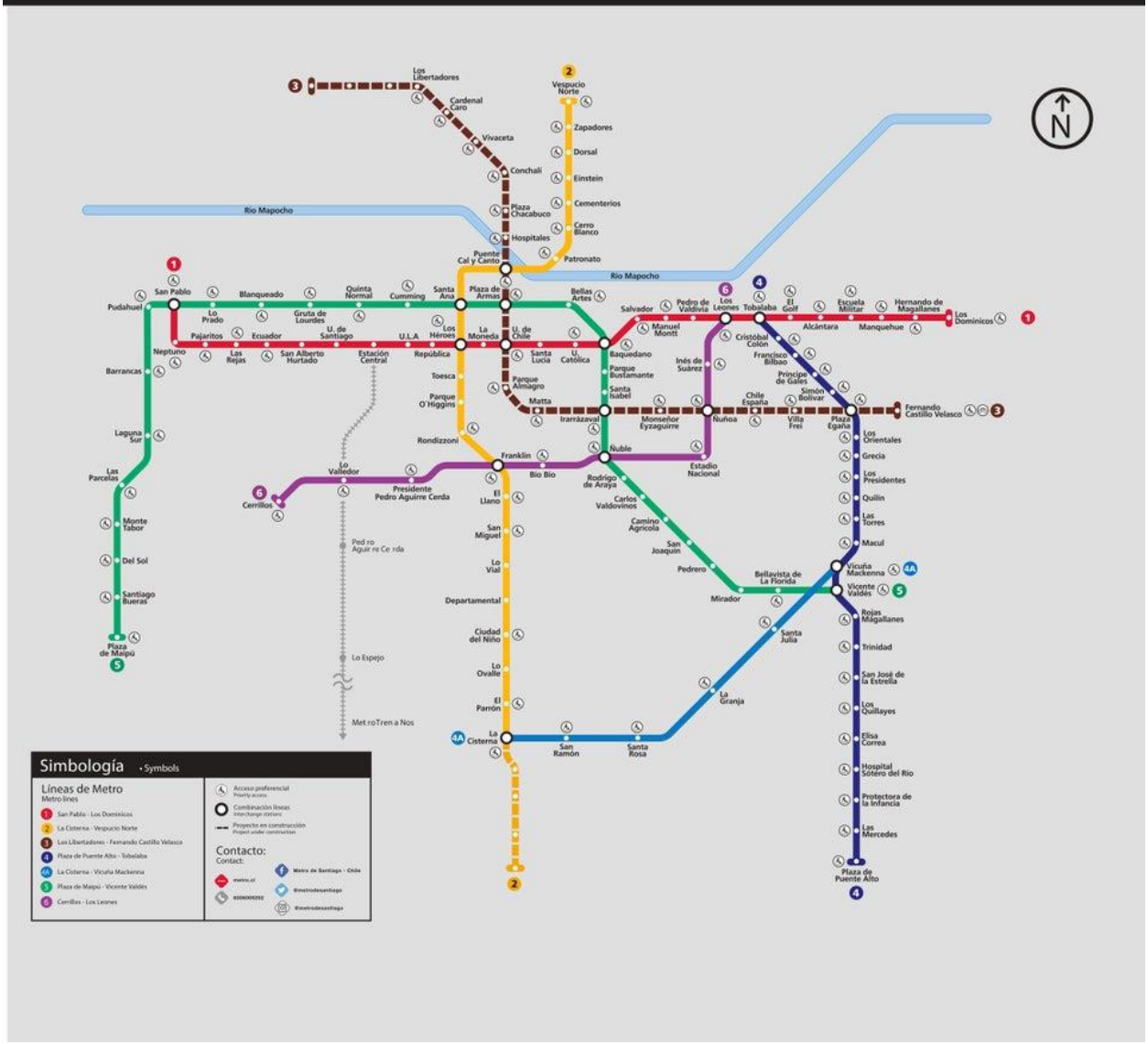


Figure 5 - Comuna Map

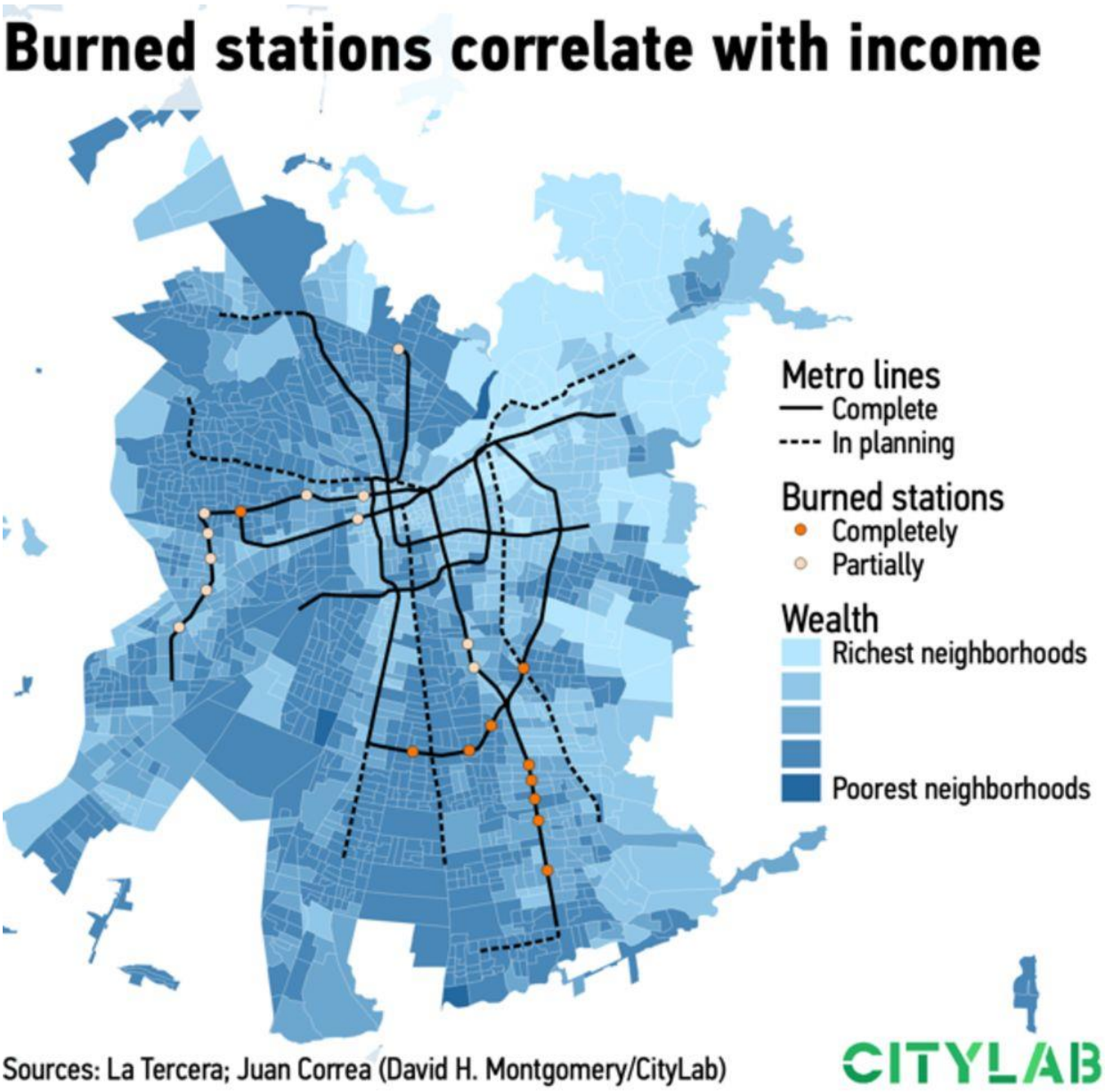


Figure 6 - Metro Overlay of Wealth & Metros Targetted

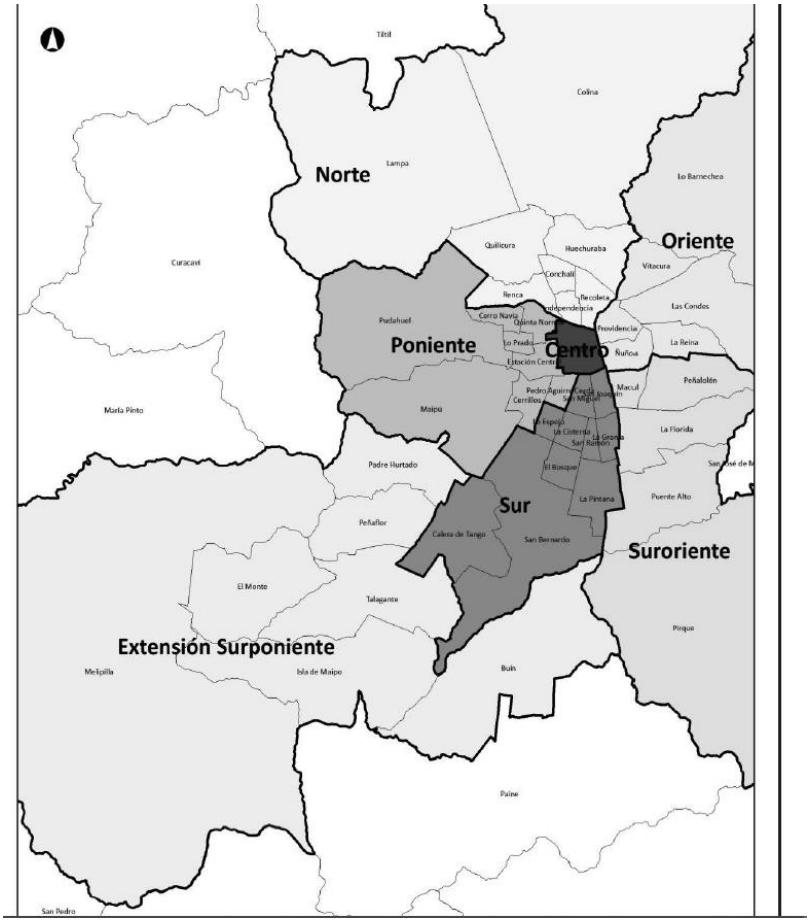


Figure 7 - Regional Divisions